

Marine Arctic Ecosystem Study (MARES): Pilot Project - Marine Mammal Tagging and Tracking

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LONG-TERM GOALS

The overarching goal of the MARES project is to understand the inter-relationships of biophysical and chemical parameters on living resources, including marine mammals that use this ecosystem. This larger picture of the effect of the Mackenzie River plume needs to be interpreted with respect to historic information and findings, including the ANIMIDA I-III, U.S. - Canada *Transboundary Fish* and Lower Trophic Communities and CASES studies and to interpret the MARES findings in reference to the significant decrease in sea ice.

The marine mammal component of MARES is providing habitat use information through animal mounted sensors that transmit location as well as dive profiles, CTD and fluorometer data. The transmitters are expected to report for six months or longer. Field work during the entire program will focus on tagging bearded seals (*Erignathus barbatus*), belugas whales (*Delphinapterus leucas*), and bowhead whales (*Balaena mysticetus*), and other ice-associated seals. The marine mammal component of this project will focus on the eastern Beaufort Sea area. To avoid duplication in field efforts and impacts on communities and wildlife, Stantec has established collaborations with ongoing tagging efforts lead by the North Slope Borough and the Alaska Department of Fish and Game and is also coordinating with other research groups at USGS, NMML, BP, DFO and other institutions.

OBJECTIVES

A pilot program of the marine mammal tagging and tracking effort is the precursor of the MARES' main field program planned for 2016 and 2017. The purpose of this pilot program in 2015 was to test instrumentation, sensors, capture methods, communication protocols, and to establish the necessary relationships within the Native Alaska communities where tagging is anticipated to occur.

The specific technical objectives during 2015 for this Task Order (TO) are to:

- Develop tagging sites with Native Alaska communities and access to animals in preparation for primary field efforts in 2016/2017
 - Specifically: Determine specific tagging sites to be used during the primary field effort in 2016/2017 in coordination and consultation with local Native communities.

- Test tag deployment and data recovery in preparation for primary field efforts in 2016/2017.
 - Specifically: Refine methods for animal capture, tag deployment, and data recovery from bearded seals and other species in preparation of the primary field effort in 2016/2017. Near real-time data will be retrieved from seals tagged in 2015.

APPROACH

During this TO, the Stantec focused on tagging bearded and spotted seals with satellite tags to measure the ocean environment and the movements of these species. Testing of animal capture and tag attachment was performed in the Beaufort Sea to develop the necessary techniques in areas where tagging was already occurring. Data from the tags were received in near real-time.

Location information from satellite tags was filtered and quality checked according to ARGOS protocols. Tag data were extracted, processed, analyzed, and uploaded in near real-time. Post-processing will include the editing, adjustment, and validation of hydrographic profiles. Data will be quality checked by the Contractor's physical and biological oceanographers.

Data from the tags is to be disseminated and made publically available in a timely fashion into the Animal Telemetry Network (ATN) through the U.S. Integrated Ocean Observing System (U.S. IOOS) and to the regional association, the Alaska Ocean Observing System (AOOS).

All data acquired as part of this TO and associated metadata will be managed following the government's approved data management plan presented by the Contractor in their proposal and at the post-award meeting. All data acquired as part of the TO and associated metadata shall also follow the metadata standards in the newly developed Animal Telemetry Network (ATN) through the NOAA Integrated Ocean Observing System (IOOS) Program. Tracking data will be deposited in the ATN through the U.S. IOOS and the Alaska Ocean Observing System (AOOS) regional association. A data access policy shall be developed that is consistent with data archive and access standards adopted by BOEM, the National Oceanographic Data Center (NODC), the National Oceanic and Atmospheric Agency, and other federal agencies.

WORK COMPLETED

Stantec scientist Rowenna Gryba, worked with collaborating scientist from the North Slope Borough (NSB), Andrew VonDuyke, and NSB field technicians Joe Skin, Issac Leavitt, and Aaron Morris. Tagging efforts focused on Dease Inlet and Peard Bay/Kugrua Bay, Alaska.

Two spotted seals (one female and one male) and two bearded seals (both male) were tagged with MARES tags in Dease Inlet, Alaska. Dr. J. "Craig" George (NSB) also assisted with some of the captures. Additional seals were captured and tagged with NSB tags in this region.

One spotted seal (male) was tagged in Kugrua Bay with a MARES tag. Additional smaller spotted seals were tagged with NSB tags. The field crew, consisting of Harry Brower, A. VonDuyke, Dr. C. George, R. Gryba, Cyd Hanns and A. Morris. Bearded seals were sighted in open water during travel to Peard Bay but none were observed in Peard Bay or Kugrua Bay. The team attempted to go up river but shallow waters prevented additional river search for bearded seals in the region.

Bearded seal tagging will be attempted again in October 2015.

The beluga whales that were targeted for tagging near Point Hope moved through the area earlier than in previous years, and the tagging team was not able to tag any belugas during 2015. Tagging efforts were coordinated with NSB scientist Dr. Robert Suydam.

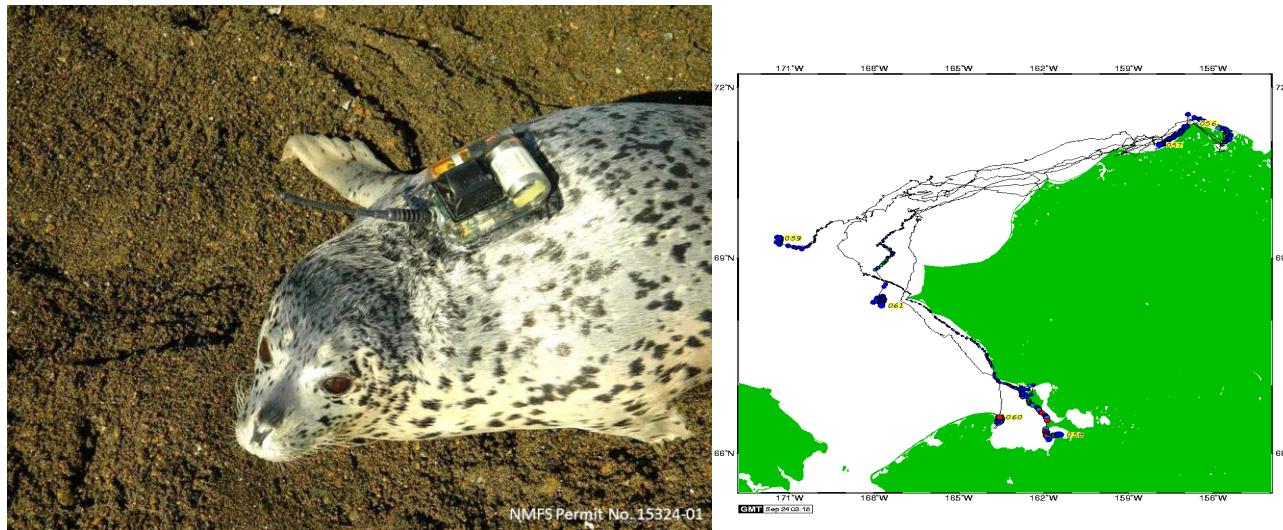


Figure 1: Spotted seal with CTD/fluorometer tag (left); tagged spotted (#58-60) and bearded (#57, 61) seal movements (right) with Alaska coastline shown in green; Barrow is at top of map.

RESULTS

A total of three spotted seals and two bearded seals were tagged with CTD ocean sampling tags with fluorometers. The data are preliminary, awaiting final analyses, as the field season is ongoing. In addition to locations and area travelled, the tags provide temperature, salinity, fluorescence, time spent hauled out, cruising, diving, dive parameters, and distance traveled.

The movements of the 5 seals to date, along with a sampling of the oceanographic and dive data which will be analyzed under this project, are displayed below.

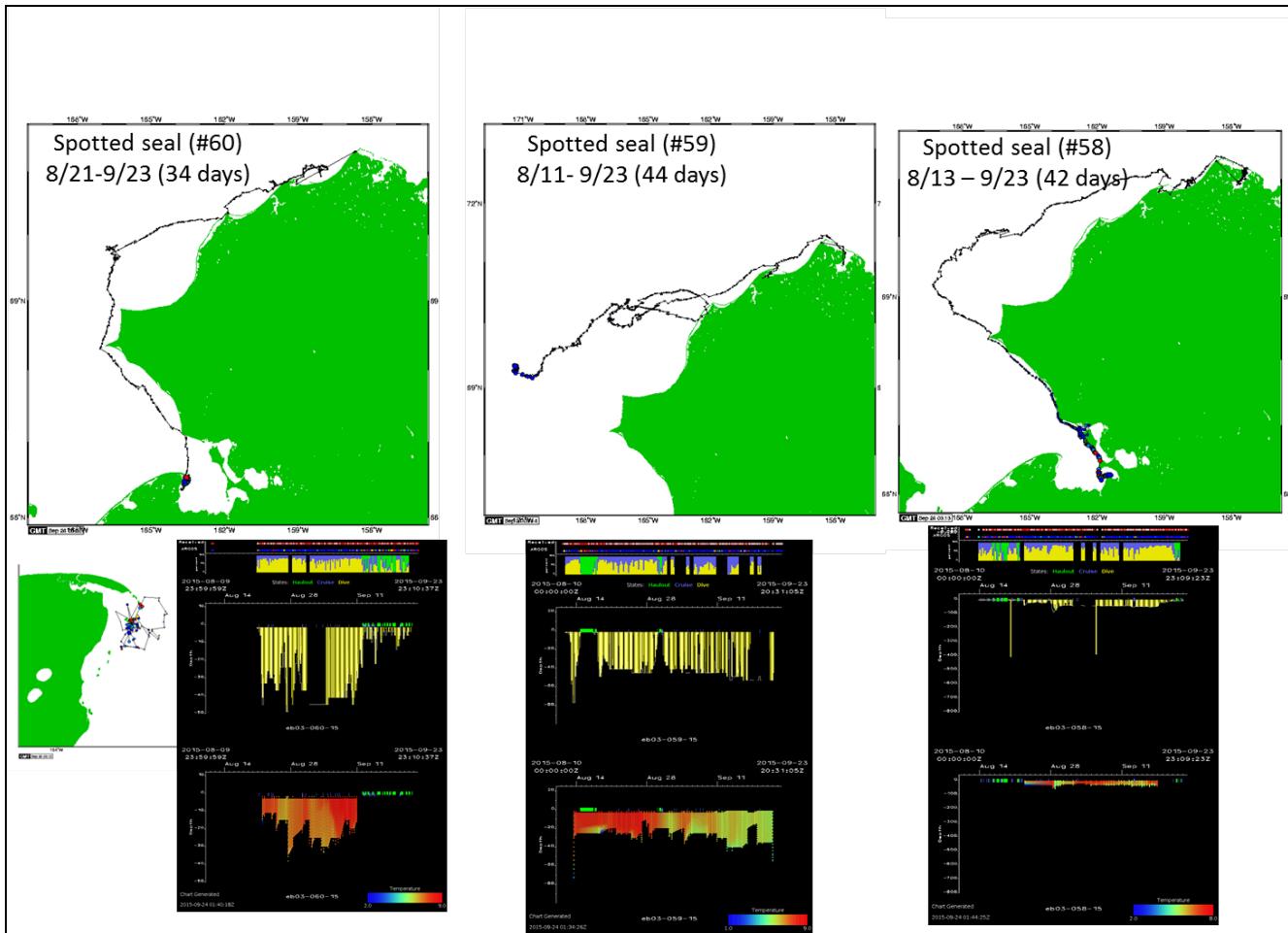


Figure 2: Movements, dive characteristics and, and behavioral summaries for 3 spotted seals tagged with CTD-fluorometer tags illustrating an example of the data to be analyzed for this project.

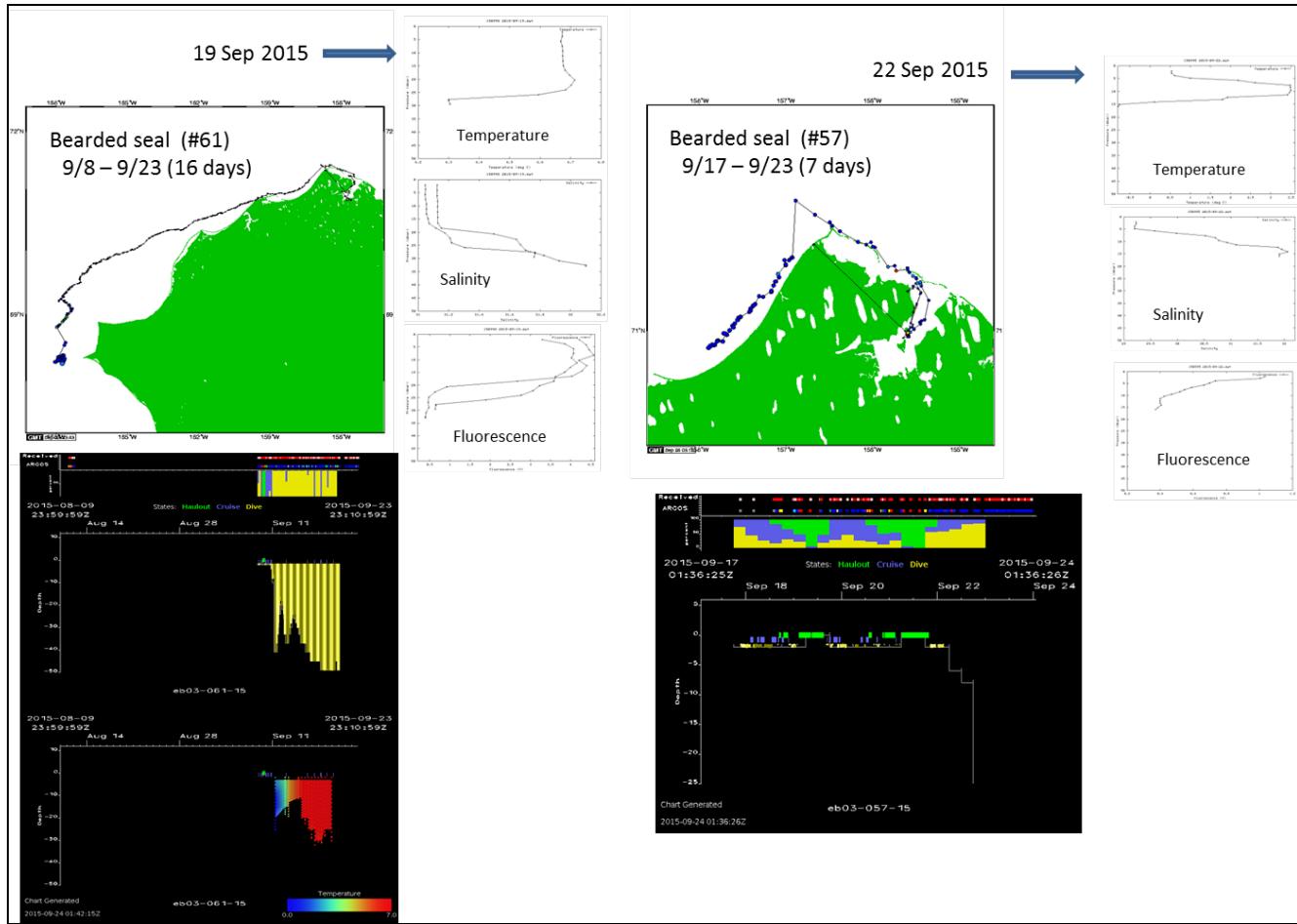


Figure 3: Movements, dive characteristics and, and behavioral summaries for 2 bearded seals tagged with CTD-fluorometer tags illustrating an example of the data to be analyzed for this project.

RELATED PROJECTS

This project is a National Oceanographic Partnership Program (NOPP) project. NOPP is an innovative collaboration of federal agencies that support ocean research partnerships among academia, government, industry, and non-governmental organizations. Co-sponsors of this part of the MARES project include: Bureau of Ocean Energy Management, Office of Naval Research, U.S. Coast Guard, and Royal Dutch Shell (Alaska Venture).